

SECTION 23-1 REVIEW

SPECIALIZED TISSUES IN PLANTS

VOCABULARY REVIEW Distinguish between the terms in each of the following groups of terms.

1. **parenchyma, collenchyma, sclerenchyma** _____

2. **dermal tissue, ground tissue, vascular tissue** _____

3. **apical meristem, indeterminate growth** _____

MULTIPLE CHOICE Write the correct letter in the blank.

- _____ 1. The main phloem cells are
a. epidermal cells. b. sieve tube elements. c. vessel elements. d. meristems.
- _____ 2. Which of the following cells are found in ground tissue and have thin cell walls and large vacuoles?
a. companion cells b. parenchyma c. collenchyma d. sclerenchyma
- _____ 3. Which of the following should a student examine under a microscope to observe cell division?
a. epidermis of a leaf c. xylem from a tree trunk
b. tip of a shoot d. phloem from a vein in a leaf of a plant
- _____ 4. If some of the xylem of an oak tree was destroyed, it would most likely interfere with the tree's ability to
a. conduct sugars to the roots. c. absorb sunlight for photosynthesis.
b. absorb carbon dioxide from the air. d. conduct water to the leaves.
- _____ 5. The purpose of the cuticle on a plant is to?
a. capture sunlight for photosynthesis. c. absorb water and minerals from the soil.
b. protect the plant from losing water. d. serve as a site for storing sugar.

SHORT ANSWER Answer the questions in the space provided.

1. Contrast the flow of materials in xylem and phloem. (p.581) _____

2. How is the function of parenchyma cells different from the collenchyma and sclerenchyma cells? (p.582)

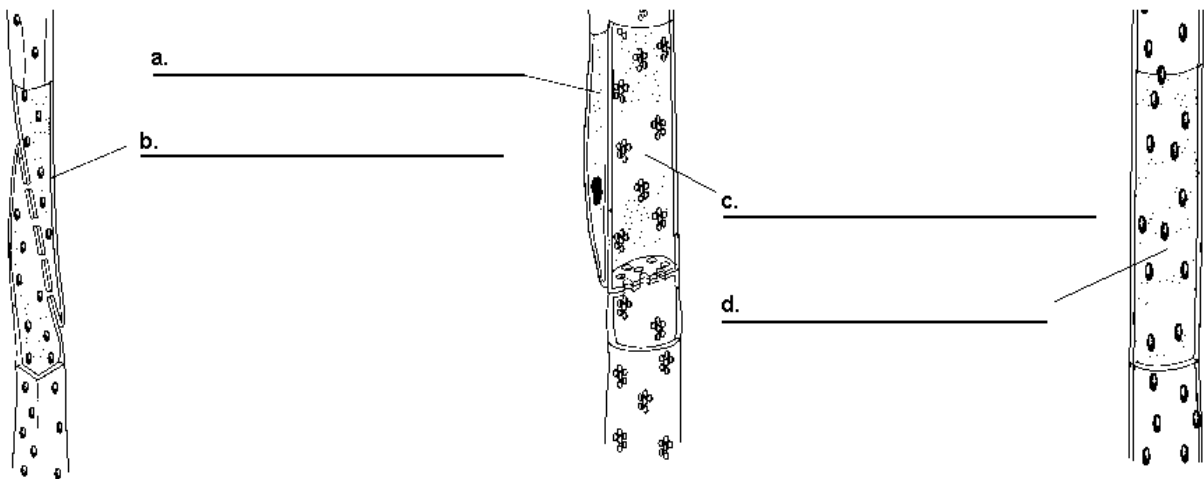
3. What kind of meristem is found in the tips of plant roots and stems? (p.582) _____

4. What three kinds of tissues does meristematic tissue develop into? (p.583) _____

5. Why is it an advantage for plants to have water transporting cells that are dead? (p.581) _____

6. Name the three main organs of seed plants. (p.579) _____

STRUCTURES AND FUNCTIONS The drawings below depict the major components of xylem and phloem. Identify the structures labeled *a* - *d*. Use the following terms: companion cell, sieve tube element, vessel element, and tracheid. (p.581)



SECTION 23-2 REVIEW

ROOTS

VOCABULARY REVIEW Define the following terms.

1. **taproot** _____

2. **fibrous root** _____

3. **vascular cylinder** _____

4. **Casparian strip** _____

5. **cortex** _____

MULTIPLE CHOICE Write the correct letter in the blank.

- _____ 1. One example of a plant with a fibrous root system is a
a. carrot. b. dandelion. c. beet. d. grass.
- _____ 2. All of the following adaptations increase the ability of roots to absorb water except
a. root caps. c. fibrous root systems.
b. root hairs. d. active transport of minerals into the plant.
- _____ 3. The waterproof wax layer that surrounds cells of the endodermis is the
a. vascular cambium. b. Casparian strip. c. vascular cylinder. d. cortex.
- _____ 4. Roots perform all of the following functions except
a. absorbing water and minerals from the soil.
b. anchoring the plant in the soil.
c. carrying out the light reactions of photosynthesis.
d. storing water and organic compounds.
- _____ 5. The layer of cells that encloses the vascular tissue in the central region of a root is the
a. endodermis. b. epidermis. c. mesophyll. d. root hair.

SHORT ANSWER Answer the questions in the space provided.

1. What kind of tissue forms the innermost cylinder of a root? (p.585) _____

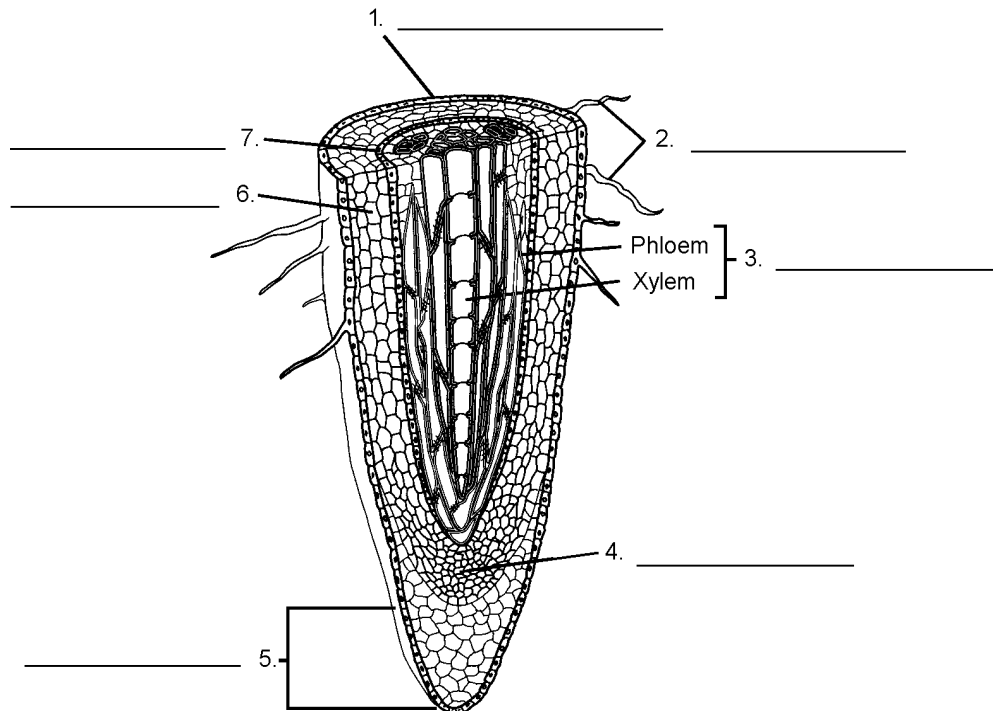
2. Starting with the root hairs, name all of the regions, or cells, that water would pass through on its way to the xylem cells of the vascular cylinder. (p.587) _____

3. What are the two main functions of roots? (p.586) _____

4. How might a plant be affected by the loss of its root caps? (p.585) _____

5. Explain the role of active transport in the movement of water and dissolved minerals from the soil to the vascular cylinder of a plant root. (pp.587-588) _____

STRUCTURES AND FUNCTIONS Label the parts of a root in the diagram below. Use the following terms: cortex, endodermis, root cap, root hairs, apical meristem, epidermis, and vascular cylinder. (p.585)



SECTION 23-3 REVIEW

STEMS

VOCABULARY REVIEW Distinguish between the terms in each of the following groups of terms.

1. **node, internode** _____

2. **primary growth, secondary growth** _____

3. **vascular cambium, cork cambium** _____

4. **heartwood, sapwood** _____

MULTIPLE CHOICE Write the correct letter in the blank.

- _____ 1. Which of the following are found in both roots and stems?
a. buds b. vascular tissue c. nodes d. internodes
- _____ 2. Buds arise from meristems located
a. randomly along the main stem. c. between the bark and the wood.
b. deep inside the main stem. d. at nodes on the surface of the main stem.
- _____ 3. One difference between monocot stems and dicot stems is that monocot stems usually
a. have vascular bundles arranged in a ring.
b. replace primary tissues with secondary tissues.
c. have vascular bundles scattered throughout the stem's ground tissue.
d. have secondary growth.
- _____ 4. In a stem cross section, an annual ring represents an abrupt change between the
a. early wood and late wood. c. bark and cork.
b. heartwood and sapwood. d. xylem and phloem.
- _____ 5. Increases in the thickness of dicot stems over time result from the production of vascular tissue by the
a. vascular cambium. c. hydrolysis of ATP.
b. cork cambium. d. Both a and b are correct.

SHORT ANSWER Answer the questions in the space provided.

1. What are two important functions that stems provide? (p.589) _____

2. How are the vascular bundles arranged in the stems of monocots and dicots? (p.590) _____

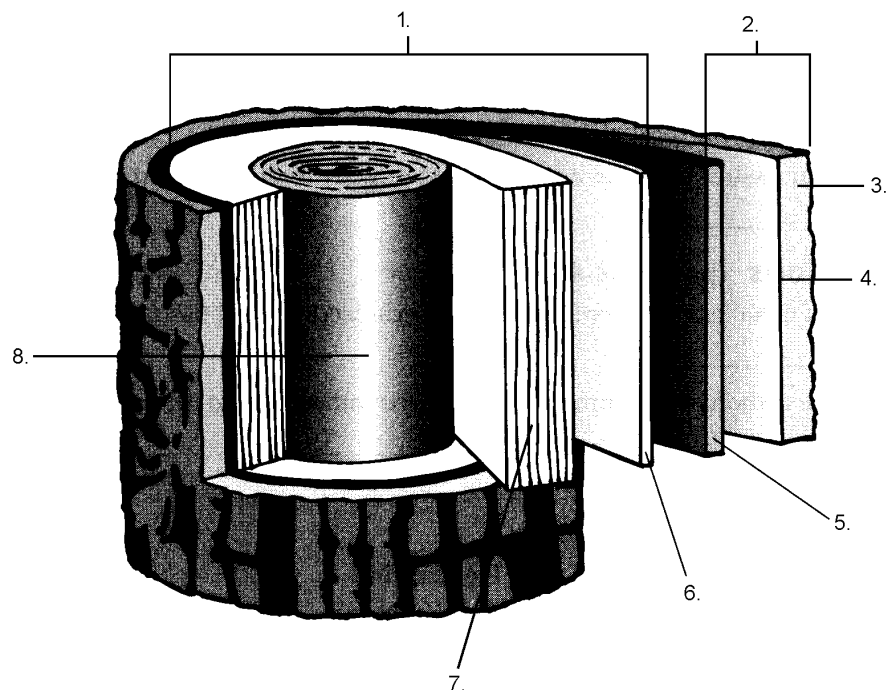
3. In a monocot stem, what does each vascular bundle contain? (p.590) _____

4. In a dicot stem, where are the cortex and pith cells located, and what is the name of the cells that make-up these regions called? (p.590) _____

5. What are two differences between heartwood and sapwood? (p.592) _____

6. Name the four modified stems that store food. (p.594) _____

STRUCTURES AND FUNCTIONS Label the parts of the diagram showing a cross section of a tree. Use the following terms: cork, wood, bark, heartwood, cork cambium, vascular cambium, sapwood, and phloem. (p.593)



SECTION 23-4 REVIEW

LEAVES

VOCABULARY REVIEW Define the following terms.

1. **blade** _____

2. **petiole** _____

3. **stoma** _____

4. **guard cells** _____

5. **transpiration** _____

MULTIPLE CHOICE Write the correct letter in the blank.

- _____ 1. A leaf that is divided into leaflets is called a
a. simple leaf. b. compound leaf. c. veined leaf. d. parallel leaf.
- _____ 2. Leaves consist of
a. dermal tissue only. c. ground tissue and vascular tissue only.
b. dermal tissue and ground tissue only. d. dermal tissue, ground tissue, and vascular tissue.
- _____ 3. Within a leaf, there are many air spaces between the cells of the
a. palisade mesophyll layer. c. spongy mesophyll layer.
b. lateral meristematic region of the leaf blade. d. cuticle.
- _____ 4. Most photosynthesis occurs in a portion of the leaf called the
a. vascular bundle. c. palisade mesophyll.
b. spongy mesophyll. d. upper epidermis.
- _____ 5. Stomata open and close in response to pressure within the
a. root cells. c. cortex cells.
b. guard cells. d. vascular cambium cells.

SHORT ANSWER Answer the questions in the space provided.

1. Explain why the following leaves have been modified in their form. (p.598)

pitcher plant _____

cactus spine _____

pine needle _____

2. Why does the stomata of a plant open after the plant has been watered? (p.597)_____

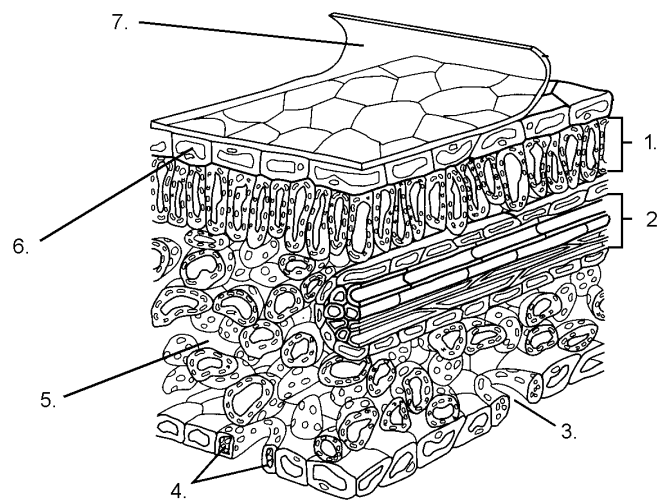
3. How is the structure of a leaf optimized to collect sunlight and carry out photosynthesis? (pp.596-597)_____

4. Name the three gases that are exchanged with the plant's leaf and the atmosphere. (p.597)_____

5. Transpiration is a necessary evil for plants. What is meant by this statement? (p.597)_____

6. Why must carnivorous plants rely on insects for their source of nitrogen? (p.598)_____

STRUCTURES AND FUNCTIONS Label the diagram below showing a cross section of a dicot leaf. Use the following terms: stoma, vein, cuticle, guard cells, palisade mesophyll, epidermis, spongy mesophyll with air spaces. (p.596)



SECTION 23-5 REVIEW

TRANSPORT IN PLANTS

VOCABULARY REVIEW Define the following terms.

1. **adhesion** _____

2. **capillary action** _____

3. **pressure-flow hypothesis** _____

4. **source** _____

5. **sink** _____

MULTIPLE CHOICE Write the correct letter in the blank.

- _____ 1. The main, driving force for transpiration is provided by
 - a. water pressure in the roots.
 - b. water tension in the stems.
 - c. the evaporation of water from the leaves.
 - d. the hydrolysis of ATP.
- _____ 2. The attraction of water molecules to different types of substances is called
 - a. adhesion.
 - b. cohesion.
 - c. capillary action.
 - d. transpiration.
- _____ 3. The attraction of water molecules to each other is called
 - a. adhesion.
 - b. cohesion.
 - c. capillary action.
 - d. transpiration.
- _____ 4. The tendency of water to rise in a thin tube is known as
 - a. adhesion.
 - b. capillary action.
 - c. root pressure.
 - d. transpiration.
- _____ 5. One idea used to explain how the movement of sugar and other materials through phloem is regulated is the
 - a. transpiration hypothesis.
 - b. osmosis hypothesis.
 - c. regulation hypothesis.
 - d. pressure-flow hypothesis.

SHORT ANSWER Answer the questions in the space provided.

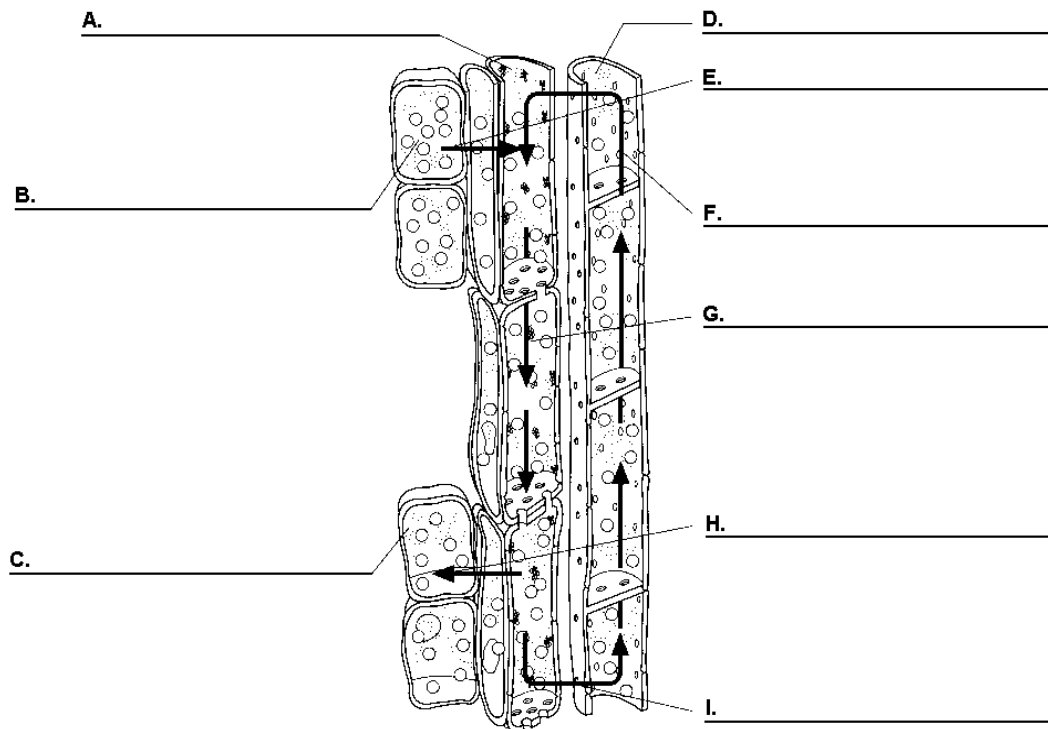
1. A combination of what three processes are involved in the movement of water through a plant. (p.599)_____

2. How does wilting help a plant conserve water? (p.601)_____

3. Explain the difference between the source cells and the sink cells. (p.602)_____

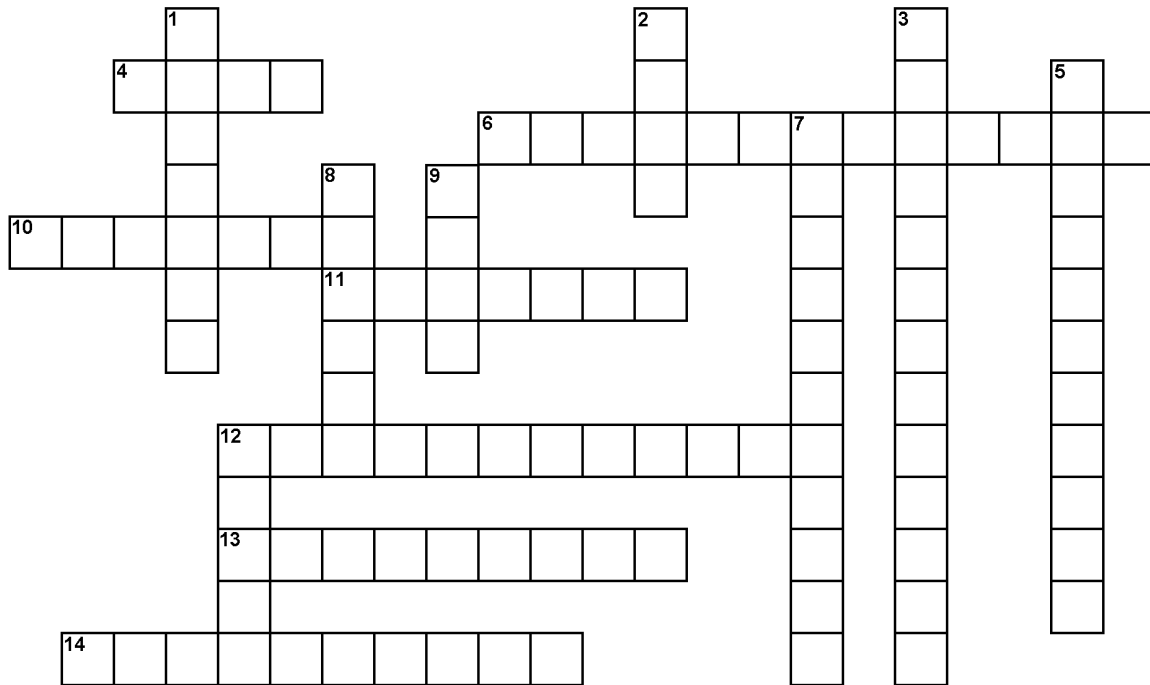
4. Compare the amount of transpiration on a cold day to the amount of transpiration on a warm day. Explain your answer. (p.600)_____

STRUCTURES AND FUNCTIONS The diagram below represents the movement of sugar and water in a plant as described by the pressure-flow model. Identify the structures labeled A-D (xylem, phloem, source, and sink) and the substances that are transported along the arrows labeled E-I (water or sugar). (p.602)



VOCABULARY - CHAPTER 23

The crossword puzzle is a simple way to master some of the more important vocabulary terms in this chapter.



Across

4. dermal tissue on the outside of a tree
6. the loss of water from a plant's leaves or stems
10. a leaf stalk
11. openings in the leaves that allow for the exchange of oxygen and carbon dioxide
12. ground tissue with both a primary and secondary cell wall; very strong and is often called fibers
13. dermal tissue that covers the soft parts of plants and often produces a waxy substance to prevent water loss
14. ground tissue with very thin cell walls; good for storage and photosynthesis

Down

1. vascular _____ is a meristematic tissue that gives rise to secondary phloem and secondary xylem
2. sugar is produced at the source and transported to the _____ for storage
3. the movement of sugar from one part of a plant to another
5. ground tissue with unevenly thick cell walls which is used by plants for support
7. meristematic tissue found in certain types of monocots like grass
8. a large, straw-shaped xylem cell that conducts water
9. _____ hairs increase the surface area and therefore allow for a greater amount of water absorption
12. The _____ cell is a phloem cell that conducts sugar

The following terms are used in this puzzle but are **not** found in this chapter. Use a reference source and look up their meaning: **translocation and intercalary**.